LIST OF CONTENTS

JANUARY

Articles

SUSAN M. HENRICHS and JOHN W. FARRINGTON: Early diagenesis of amino acids and organic matter in two coastal marine sediments 1

R. FRANCOIS: A study of sulphur enrichment in the humic fraction of marine sediments during early diagenesis 17

WILLIAM M. LANDING and KENNETH W. BRULAND: The contrasting biogeochemistry of iron and manganese in the Pacific Ocean 29

S. CHAUDHURI, V. BROEDEL and N. CLAUER: Stontium isotopic evolution of oil-field waters from carbonate reservoir rocks in Bindley field, central Kansas, U.S.A. 45

T. H. GREEN and N. J. PEARSON: An experimental study of Nb and Ta partitioning between Ti-rich minerals and silicate liquids at high pressure and temperature 55

E. J. REARDON and D. K. ARMSTRONG: Celestite ($SrSO_{4(S)}$) solubility in water, seawater and NaCl solution 63

ANTHONY ZAIKOWSKI, BONNIE J. KOSANKE and NORMAN HUBBARD: Noble gas composition of deep brines from the Palo Duro Basin, Texas 73

MILTON BLANDER and ARTHUR D. PELTON: Thermodynamic analysis of binary liquid silicates and prediction of ternary solution properties by modified quasichemical equations 85

S. SEIFERT and H. ST. C. O'NEILL: Experimental determination of activity-composition relations in Ni_2SiO_4-Mg_2SiO_4 and Co_2SiO_4-Mg_2SiO_4 olivine solid solutions at 1200 K and 0.1 MPa and 1573 K and 0.5 GPa 97

A. MANCEAU, S. LLORCA and G. CALAS: Crystal chemistry of cobalt and nickel in lithiophorite and asbolane from New Caledonia 105

K. SHIMOKAWA and N. IMAI: Simultaneous determination of alteration and eruption ages of volcanic rocks by electron spin resonance 115

J. R. RUAYA and T. M. SEWARD: The ion-pair constant and other thermodynamic properties of HCl up to 350°C 121

R. OSTERTAG, D. STÖFFLER, R. BORCHARDT, H. PALME, B. SPETTEL and H. WÄNKE: Precursor lithologies and metamorphic history of granulitic breccias from North Ray crater, Station 11, Apollo 16 131

J. K. RUSSELL and J. NICHOLLS: Early crystallization history of alkali olivine basalts, Diamond Craters, Oregon .. 143

JOHAN INGRI and CHRISTER PONTÉR: Rare earth abundance patterns in ferromanganese concretions from the Gulf of Bothnia and the Barents Sea 155

S. V. S. MURTY and K. MARTI: Nucleogenic noble gas components in the Cape York iron meteorite 163

Book Reviews

S. A. MORSE: "Lunar Bases and Space Activities of the 21st Century" edited by W. W. Mendell 173

WARREN HAMILTON: "Journal of Southeast Asian Earth Sciences" edited by B. K. Tan and T. T. Khoo 173

PAUL B. MOORE: "Lead and Lead Poisoning in Antiquity" by Jerome O. Nriagu 174

JACK E. FERGUSSON: "Childhood Exposure to Environmental Lead" by B. Brunekreef 174

W. H. SCHROEDER: "Atmospheric Chemistry: Fundamentals and Experimental Techniques" by Barbara J. Finlayson-Pitts and James N. Pitts, Jr. 175

RICHARD H. SILLITOE: "Geology and Geochemistry of Epithermal Systems" edited by B. R. Berger and P. M. Bethke 175

Announcements

Geochemical Society Awards 176

Environmental Chemistry Symposia 178

Papers to Appear in Forthcoming Issues 179

Information for Contributors 181

LIST OF CONTENTS

JANUARY

Articles

SUSAN M. HENRICHS and JOHN W. FARRINGTON: Early diagenesis of amino acids and organic matter in two coastal marine sediments 1

R. FRANCOIS: A study of sulphur enrichment in the humic fraction of marine sediments during early diagenesis 17

WILLIAM M. LANDING and KENNETH W. BRULAND: The contrasting biogeochemistry of iron and manganese in the Pacific Ocean 29

S. CHAUDHURI, V. BROEDEL and N. CLAUER: Stontium isotopic evolution of oil-field waters from carbonate reservoir rocks in Bindley field, central Kansas, U.S.A. 45

T. H. GREEN and N. J. PEARSON: An experimental study of Nb and Ta partitioning between Ti-rich minerals and silicate liquids at high pressure and temperature 55

E. J. REARDON and D. K. ARMSTRONG: Celestite ($SrSO_{4(S)}$) solubility in water, seawater and NaCl solution 63

ANTHONY ZAIKOWSKI, BONNIE J. KOSANKE and NORMAN HUBBARD: Noble gas composition of deep brines from the Palo Duro Basin, Texas 73

MILTON BLANDER and ARTHUR D. PELTON: Thermodynamic analysis of binary liquid silicates and prediction of ternary solution properties by modified quasichemical equations 85

S. SEIFERT and H. ST. C. O'NEILL: Experimental determination of activity-composition relations in Ni_2SiO_4-Mg_2SiO_4 and Co_2SiO_4-Mg_2SiO_4 olivine solid solutions at 1200 K and 0.1 MPa and 1573 K and 0.5 GPa 97

A. MANCEAU, S. LLORCA and G. CALAS: Crystal chemistry of cobalt and nickel in lithiophorite and asbolane from New Caledonia 105

K. SHIMOKAWA and N. IMAI: Simultaneous determination of alteration and eruption ages of volcanic rocks by electron spin resonance 115

J. R. RUAYA and T. M. SEWARD: The ion-pair constant and other thermodynamic properties of HCl up to 350°C 121

R. OSTERTAG, D. STÖFFLER, R. BORCHARDT, H. PALME, B. SPETTEL and H. WÄNKE: Precursor lithologies and metamorphic history of granulitic breccias from North Ray crater, Station 11, Apollo 16 131

J. K. RUSSELL and J. NICHOLLS: Early crystallization history of alkali olivine basalts, Diamond Craters, Oregon .. 143

JOHAN INGRI and CHRISTER PONTÉR: Rare earth abundance patterns in ferromanganese concretions from the Gulf of Bothnia and the Barents Sea 155

S. V. S. MURTY and K. MARTI: Nucleogenic noble gas components in the Cape York iron meteorite 163

Book Reviews

S. A. MORSE: "Lunar Bases and Space Activities of the 21st Century" edited by W. W. Mendell 173

WARREN HAMILTON: "Journal of Southeast Asian Earth Sciences" edited by B. K. Tan and T. T. Khoo 173

PAUL B. MOORE: "Lead and Lead Poisoning in Antiquity" by Jerome O. Nriagu 174

JACK E. FERGUSSON: "Childhood Exposure to Environmental Lead" by B. Brunekreef 174

W. H. SCHROEDER: "Atmospheric Chemistry: Fundamentals and Experimental Techniques" by Barbara J. Finlayson-Pitts and James N. Pitts, Jr. 175

RICHARD H. SILLITOE: "Geology and Geochemistry of Epithermal Systems" edited by B. R. Berger and P. M. Bethke 175

Announcements

Geochemical Society Awards 176

Environmental Chemistry Symposia 178

Papers to Appear in Forthcoming Issues 179

Information for Contributors 181

FEBRUARY

Letter

TOSHIMORI SEKINE, MINORU AKAISHI and NOBUO SETAKA: Fe_2N-type SiO_2 from shocked quartz 379

Articles

RICHARD J. REEDER and JOHN C. GRAMS: Sector zoning in calcite cement crystals: Implications for trace element distributions in carbonates 187

DONALD B. DINGWELL and DAVID VIRGO: The effect of oxidation state on the viscosity of melts in the system Na_2O-FeO-Fe_2O_3-SiO_2 195

TSUTOMU MACHIHARA and RYOSHI ISHIWATARI: Possible carotenoid-derived structures in fossil kerogens 207

CHRISTOPHER D. DOYLE and ANTHONY J. NALDRETT: Ideal mixing of divalent cations in mafic magma. II. The solution of NiO and the partitioning of nickel between coexisting olivine and liquid 213

D. A. WARK: Plagioclase-rich inclusions in carbonaceous chondrite meteorites: Liquid condensates? 221

BRIAN D. LAFLAMME and JAMES W. MURRAY: Solid/solution interaction: The effect of carbonate alkalinity on adsorbed thorium 243

YINGWEI FEI and S. K. SAXENA: An equation for the heat capacity of solids 251

JOHN I. HEDGES and P. E. HARE: Amino acid adsorption by clay minerals in distilled water 255

H. T. HASELTON and JULIAN R. GOLDSMITH: The decarbonation and heat capacity of $ZnCO_3$ 261

DAVID W. MITTLEFEHLDT: Volatile degassing of basaltic achondrite parent bodies: Evidence from alkali elements and phosphorus 267

J. L. BODINIER, M. GUIRAUD, J. FABRIÈS, J. DOSTAL and C. DUPUY: Petrogenesis of layered pyroxenites from the Lherz, Freychinède and Prades ultramafic bodies (Ariège, French Pyrénées) 279

KEITH BELL and JOHN BLENKINSOP: Archean depleted mantle: Evidence from Nd and Sr initial isotopic ratios of carbonatites 291

JOHN R. CRONIN, SANDRA PIZZARELLO and JAMES S. FRYE: ^{13}C NMR spectroscopy of the insoluble carbon of carbonaceous chondrites 299

MARGARET LEINEN: The origin of paleochemical signatures in North Pacific pelagic clays: Partitioning experiments 305

RYOSHI ISHIWATARI and MINORU UZAKI: Diagenetic changes of lignin compounds in a more than 0.6 million-year-old lacustrine sediment (Lake Biwa, Japan) 321

A. J. FAHEY, J. N. GOSWAMI, K. D. MCKEEGAN and E. ZINNER: ^{26}Al, ^{244}Pu, ^{50}Ti, REE, and trace element abundances in hibonite grains from CM and CV meteorites 329

FRANK J. MILLERO: Estimate of the life time of superoxide in seawater 351

CRAYTON J. YAPP: Oxygen and hydrogen isotope variations among goethites (α-FeOOH) and the determination of paleotemperatures 355

ALAN B. WOODLAND and JOHN V. WALTHER: Experimental determination of the solubility of the assemblage paragonite, albite, and quartz in supercritical H_2O 365

ARIE NISSENBAUM and ANDREI SERBAN: Enzymatic (?) activity associated with humic substances in deep sediments from the Cariaco Trench and Walvis Ridge 373

Book Reviews

W. A. GLOOSCHENKO: "Biological Monitoring of Environmental Contaminants (Plants)" by M. A. S. Burton 383

JOHN R. BARKER: "Atmospheric Chemistry and Physics of Air Pollution" by John H. Seinfeld 383

Announcements

Papers to Appear in Forthcoming Issues 384

9th International Clay Conference 1989, AIPEA 386

MARCH

Letters

N. SHIMIZU and S. H. RICHARDSON: Trace element abundance patterns of garnet inclusions in peridotite-suite diamonds 755

JACK J. MIDDLEBURG, GERT J. DE LANGE and CORNELIS H. VAN DER WEIJDEN: Manganese solubility control in marine pore waters 759

Proceedings of the I.M.A. Symposium on Granites and Pegmatites

J. D. WEBSTER, J. R. HOLLOWAY and R. L. HERVIG: Phase equilibria of a Be, U and F-enriched vitrophyre from Spor Mountain, Utah 389

DAVID LONDON: Internal differentiation of rare-element pegmatites: Effects on boron, phosphorus, and fluorine .. 403

PETR ČERNÝ, BRIAN J. FRYER, FREDERICK J. LONGSTAFFE and HANS Y. TAMMEMAGI: The Archean Lac du Bonnet batholith, Manitoba: Igneous history, metamorphic effects, and fluid overprinting 421

ANA M. R. NEIVA, JOÃO M. C. NEIVA and SUSAN J. PARRY: Geochemistry of the granitic rocks and their minerals from Serra da Estrela, Central Portugal 439

WM. B. SIMMONS, MAXIE T. LEE and RENEE H. BREWSTER: Geochemistry and evolution of the South Platte granite-pegmatite system, Jefferson County, Colorado 455

C. K. SHEARER, J. J. PAPIKE and J. C. LAUL: Mineralogical and chemical evolution of a rare-element granite-pegmatite system: Harney Peak Granite, Black Hills, South Dakota 473

J. R. ROCKHOLD, P. I. NABELEK and M. D. GLASCOCK: Origin of rhythmic layering in the Calamity Peak satellite pluton of the Harney Peak Granite, South Dakota: The role of boron 487

MAMORU MURATA and TETSUMARU ITAYA: Sulfide and oxide minerals from S-type and I-type granitic rocks 497

SEPPO I. LAHTI: Zoning in columbite-tantalite crystals from the granitic pegmatites of the Eräjärvi area, southern Finland 509

B. L. JOLLIFF, J. J. PAPIKE and C. K. SHEARER: Fractionation trends in mica and tourmaline as indicators of pegmatite internal evolution: Bob Ingersoll pegmatite, Black Hills, South Dakota 519

KAZUYA KAWAKATSU and YOSHIAKI YAMAGUCHI: Successive zoning of amphiboles during progressive oxidation in the Daito-Yokota granitic complex, San-in belt, southwest Japan 535

Other Articles

ANTON P. LE ROEX, HENRY J. B. DICK, LEVENT GULEN, ARCH M. REID and ANTHONY J. ERLANK: Local and regional heterogeneity in MORB from the Mid-Atlantic Ridge between 54.5°S and 51°S: Evidence for geochemical enrichment 541

R. E. SUMMONS and T. G. POWELL: Identification of aryl isoprenoids in source rocks and crude oils: Biological markers for the green sulphur bacteria 557

GEORGE H. BRIMHALL and WILLIAM E. DIETRICH: Constitutive mass balance relations between chemical composition, volume, density, porosity, and strain in metasomatic hydrochemical systems: Results on weathering and pedogenesis 567

CHARLES GOBEIL, NORMAN SILVERBERG, BJØRN SUNDBY and DANIEL COSSA: Cadmium diagenesis in Laurentian Trough sediments 589

KIRK J. CANTRELL and ROBERT H. BYRNE: Rare earth element complexation by carbonate and oxalate ions 597

D. A. WARK, W. V. BOYNTON, R. R. KEAYS and H. PALME: Trace element and petrologic clues to the formation of forsterite-bearing Ca-Al-rich inclusions in the Allende meteorite 607

LAWRENCE R. BERNSTEIN and GLENN A. WAYCHUNAS: Germanium crystal chemistry in hematite and goethite from the Apex Mine, Utah, and some new data on germanium in aqueous solution and in stottite 623

JUDITH WRIGHT, HANS SCHRADER and WILLIAM T. HOLSER: Paleoredox variations in ancient oceans recorded by rare earth elements in fossil apatite 631

DONALD E. CANFIELD and ROBERT A. BERNER: Dissolution and pyritization of magnetite in anoxic marine sediments 645

J. C. LAUL, O. D. RODE, S. B. SIMON and J. J. PAPIKE: The lunar regolith: Chemistry and petrology of Luna 24 grain size fractions 661

CLAIR C. PATTERSON and DOROTHY M. SETTLE: Magnitude of lead flux to the atmosphere from volcanoes 675

FRED M. PHILLIPS and HAROLD W. BENTLEY: Isotopic fractionation during ion filtration: I. Theory 683

JAMES H. BUTLER, RONALD D. JONES, JONATHAN H. GARBER and LOUIS I. GORDON: Seasonal distributions and turnover of reduced trace gases and hydroxylamine in Yaquina Bay, Oregon 697

FRANK J. MILLERO, J. PETER HERSHEY and MARINO FERNANDEZ: The pK* of $TRISH^+$ in Na-K-Mg-Ca-Cl-SO_4 brines—pH scales 707

PAUL H. WARREN and ERIC A. JERDE: Composition and origin of Nuevo Laredo Trend eucrites 713

DAVID W. LINGNER, TED J. HUSTON, MELINDA HUTSON and MICHAEL E. LIPSCHUTZ: Chemical studies of H chondrites. I: Mobile trace elements and gas retention ages 727

JANE E. DENNISON and MICHAEL E. LIPSCHUTZ: Chemical studies of H chondrites. II: Weathering effects in the Victoria Land, Antarctic population and comparison of two Antarctic populations with non-Antarctic falls 741

Book Reviews

RADOMIR PETROVICH: "Rates of Chemical Weathering of Rocks and Minerals" edited by S. M. Colman and D. P. Dethier 765

DEREK W. G. SEARS: "Chemistry and Physics of Terrestrial Planets" edited by S. K. Saxena 765

A. A. LEVINSON: "Applied Geochemistry in the 1980s" edited by I. Thornton and R. J. Howarth 766

Announcements

Papers to Appear in Forthcoming Issues 767

APRIL

Articles

JOHN H. JONES and DONALD S. BURNETT: Experimental geochemistry of Pu and Sm and the thermodynamics of trace element partitioning 769

S. K. SAXENA and Y. FEI: High pressure and high temperature fluid fugacities 783

FRANK J. MILLERO, SARA SOTOLONGO and MIGUEL IZAGUIRRE: The oxidation kinetics of Fe(II) in seawater ... 793

H. L. TEN HAVEN, M. BAAS, M. KROOT, J. W. DE LEEUW, P. A. SCHENCK and J. EBBING: Late Quaternary Mediterranean sapropels. III: Assessment of source of input and palaeotemperature as derived from biological markers 803

GEORGE I. SMITH, IRVING FRIEDMAN and ROBERT J. MCLAUGHLIN: Studies of Quaternary saline lakes—III. Mineral, chemical, and isotopic evidence of salt solution and crystallization processes in Owens Lake, California, 1969–1971 811

ROBERTO T. PABALAN and KENNETH S. PITZER: Thermodynamics of NaOH(aq) in hydrothermal solutions 829

R. W. L. KIMBER and C. V. GRIFFIN: Further evidence of the complexity of the racemization process in fossil shells with implications for amino acid racemization dating 839

R. K. STOESSELL, R. E. KLIMENTIDIS and D. R. PREZBINDOWSKI: Dedolomitization in Na-Ca-Cl brines from 100° to 200°C at 300 bars 847

FRANCO D'AMORE, RUGGERO FANCELLI and COSTANZO PANICHI: Stable isotope study of reinjection processes in the Larderello geothermal field 857

M. R. WILSON, T. K. KYSER, H. H. MEHNERT and J. HOEVE: Changes in the H-O-Ar isotope composition of clays during retrograde alteration 869

BERND R. T. SIMONEIT, JOAN O. GRIMALT, J. M. HAYES and HYMAN HARTMAN: Low temperature hydrothermal maturation of organic matter in sediments from the Atlantis II Deep, Red Sea 879

ANDREW L. HERCZEG and RICHARD G. FAIRBANKS: Anomalous carbon isotope fractionation between atmospheric CO_2 and dissolved inorganic carbon induced by intense photosynthesis 895

ANNIE MICHARD, CATHERINE BEAUCAIRE and GIL MICHARD: Uranium and rare earth elements in CO_2-rich waters from Vals-les-Bains (France) 901

G. M. BANCROFT, J. B. METSON, R. A. KRESOVIC and H. W. NESBITT: Leaching studies of natural and synthetic titanites using secondary ion mass spectrometry 911

ALAN T. STONE: Microbial metabolites and the reductive dissolution of manganese oxides: Oxalate and pyruvate 919

W. R. MARTIN and F. L. SAYLES: Seasonal cycles of particle and solute tranport processes in nearshore sediments: $^{222}Rn/^{226}Ra$ and $^{234}Th/^{238}U$ disequilibrium at a site in Buzzards Bay, MA 927

FABIENNE TROLARD and YVES TARDY: The stabilities of gibbsite, boehmite, aluminous goethites and aluminous hematites in bauxites, ferricretes and laterites as a function of water activity, temperature and particle size 945

D. WEIS and G. J. WASSERBURG: Rb-Sr and Sm-Nd systematics of cherts and other siliceous deposits 959

D. WEIS and G. J. WASSERBURG: Rb-Sr and Sm-Nd isotope geochemistry and chronology of cherts from the Onverwacht Group (3.5 AE), South Africa 973

M. T. MURRELL and D. S. BURNETT: Actinide chemistry in Allende Ca-Al-rich inclusions 985

DANIEL J. REPETA and ROBERT B. GAGOSIAN: Carotenoid diagenesis in recent marine sediments—I. The Peru continental shelf (15°S, 75°W) 1001

G. S. CLARK and P. ČERNÝ: Radiogenic ^{87}Sr, its mobility, and the interpretation of Rb-Sr fractionation trends in rare-element granitic pegmatites 1011

Erratum

MARK D. KURZ: Erratum to *Geochim. Cosmochim. Acta* **50**, 2855–2862 1019

Book Reviews

ROBERT J. BODNAR: "Fluid Inclusion Research, Proceedings of COFFI, Volume 16, 1983" edited by Edwin Roedder and Andrzej Kozlowski 1021

DANIEL R. MUHS: "Dating Methods of Pleistocene Deposits and Their Problems" edited by N. W. Rutter 1022

Announcements

The Geochemical Society, Minutes (November Meeting) 1023

The Geochemical Society, Organic Geochemistry Division, Minutes 1028

Organic Geochemistry Division, Slate of Officers 1030

Papers to Appear in Forthcoming Issues 1031

MAY

Articles

A. J. SPIVACK and J. M. EDMOND: Boron isotope exchange between seawater and the oceanic crust 1033

CHARLES E. HARVIE, JERRY P. GREENBERG and JOHN H. WEARE: A chemical equilibrium algorithm for highly non-ideal multiphase systems: Free energy minimization 1045

DAVID HEGGIE, GARY KLINKHAMMER and DOUGLAS CULLEN: Manganese and copper fluxes from continental margin sediments 1059

FABIENNE LEMARCHAND, BENOÎT VILLEMANT and GEORGES CALAS: Trace element distribution coefficients in alkaline series 1071

BRADLEY J. HUIZINGA, ELI TANNENBAUM and ISAAC R. KAPLAN: The role of minerals in the thermal alteration of organic matter—IV. Generation of *n*-alkanes, acyclic isoprenoids, and alkenes in laboratory experiments 1083

R. E. CRISS, R. T. GREGORY and H. P. TAYLOR, JR.: Kinetic theory of oxygen isotopic exchange between minerals and water 1099

WILLIAM H. CASEY and ANTONIO C. LASAGA: Modeling solute transport and sulfate reduction in marsh sediments 1109

STEVEN J. FRITZ, DAVID W. HINZ and ETHAN L. GROSSMAN: Hyperfiltration-induced fractionation of carbon isotopes 1121

MICHAL SHATKAY and MORDECHAI MAGARITZ: Dolomitization and sulfate reduction in the mixing zone between brine and meteoric water in the newly exposed shores of the Dead Sea 1135

H. POTHS, S. SCHMITT-STRECKER and F. BEGEMANN: On the isotopic composition of ruthenium in the Allende and Leoville carbonaceous chondrites 1143

LAURIE S. BALISTRIERI and JAMES W. MURRAY: The influence of the major ions of seawater on the adsorption of simple organic acids by goethite 1151

J. VAL KLUMP and CHRISTOPHER S. MARTENS: Biogeochemical cycling in an organic-rich coastal marine basin. 5. Sedimentary nitrogen and phosphorus budgets based upon kinetic models, mass balances, and the stoichiometry of nutrient regeneration 1161

PATRICK M. CRILL and CHRISTOPHER S. MARTENS: Biogeochemical cycling in an organic-rich coastal marine basin. 6. Temporal and spatial variations in sulfate reduction rates 1175

JEFFREY P. CHANTON, CHRISTOPHER S. MARTENS and MARTIN B. GOLDHABER: Biogeochemical cycling in an organic-rich coastal marine basin. 7. Sulfur mass balance, oxygen uptake and sulfide retention 1187

JEFFREY P. CHANTON, CHRISTOPHER S. MARTENS and MARTIN B. GOLDHABER: Biogeochemical cycling in an organic-rich coastal marine basin. 8. A sulfur isotopic budget balanced by differential diffusion across the sediment-water interface 1201

ROBERT L. ERIKSON and CHARLES J. HOSTETLER: Application of empirical ionic models to SiO_2 liquid: Potential model approximations and integration of SiO_2 polymorph data 1209

A. D. KIRWAN, JR. and LEE R. KUMP: Models of geochemical systems from mixture theory: Diffusion 1219

PETER DEINES, J. W. HARRIS and J. J. GURNEY: Carbon isotopic composition, nitrogen content and inclusion composition of diamonds from the Roberts Victor kimberlite, South Africa: Evidence for ^{13}C depletion in the mantle 1227

BARBARA P. BISHOP and DENNIS K. BIRD: Variation in sericite compositions from fracture zones within the Coso Hot Springs geothermal system 1245

D. J. PIEPGRAS and G. J. WASSERBURG: Rare earth element transport in the western North Atlantic inferred from Nd isotopic observations 1257

STEPHEN B. SOCHA and ROY CARPENTER: Factors affecting pore water hydrocarbon concentrations in Puget Sound sediments 1273

M. IGGY LITAOR: Aluminum chemistry: Fractionation, speciation, and mineral equilibria of soil interstitial waters of an alpine watershed, Front Range, Colorado 1285

STUART ROSS TAYLOR: The unique lunar composition and its bearing on the origin of the Moon 1297

ROBERT N. MILLER and PETER H. GIVEN: The association of major, minor and trace inorganic elements with lignites. II. Minerals, and major and minor element profiles, in four seams 1311

PAUL P. HEARN, JR., JOHN F. SUTTER and HARVEY E. BELKIN: Evidence for Late-Paleozoic brine migration in Cambrian carbonate rocks of the central and southern Appalachians: Implications for Mississippi Valley-type sulfide mineralization 1323

Book Reviews

JARDA DOSTAL: "Petrogenesis of the Volcanic Rocks of the Karoo Province" edited by A. J. Erlank 1335

WARD CHESWORTH: "Le Cycle de l'Eau" by Yves Tardy 1335

ROBIN BRETT: "Origin of the Moon" edited by W. K. Hartman, R. J. Phillips and G. J. Taylor 1336

Announcements

The Geochemical Society, Awards 1337

Executive Editor of Geochimica et Cosmochimica Acta 1339

1987 Gordon Research Conference 1340

Papers to Appear in Forthcoming Issues 1341

JUNE

Letter

PETER I. NABELEK: General equations for modeling fluid/rock interaction using trace elements and isotopes 1765

Articles

W. M. BERELSON, D. E. HAMMOND and K. S. JOHNSON: Benthic fluxes and the cycling of biogenic silica and carbon in two southern California borderland basins 1345

MITSUGU NISHIMURA and EARL W. BAKER: Compositional similarities of non-solvent extractable fatty acids from recent marine sediments deposited in differing environments 1365

JOAN GRIMALT and JOAN ALBAIGÉS: Sources and occurrence of C_{12}-C_{22} *n*-alkane distributions with even carbon-number preference in sedimentary environments 1379

ELLIOT C. SPIKER and PATRICK G. HATCHER: The effects of early diagenesis on the chemical and stable carbon isotopic composition of wood 1385

L. N. PLUMMER and E. BUSENBERG: Thermodynamics of aragonite-strontianite solid solutions: Results from stoichiometric solubility at 25 to 76°C 1393

WILLIAM D. BISCHOFF, FRED T. MACKENZIE and FINLEY C. BISHOP: Stabilities of synthetic magnesian calcites in aqueous solution: Comparison with biogenic materials 1413

W. V. ENGELHARDT, E. LUFT, J. ARNDT, H. SCHOCK and W. WEISKIRCHNER: Origin of moldavites 1425

GABOURY BENOIT and HAROLD F. HEMOND: A biogeochemical mass balance of ^{210}Po and ^{210}Pb in an oligotrophic lake with seasonally anoxic hypolimnion 1445

MAHLON C. KENNICUTT II, GUY J. DENOUX, JAMES M. BROOKS and WILLIAM A. SANDBERG: Hydrocarbons in Mississippi Fan and intraslope basin sediments 1457

P. S. COOK and J. D. CASHION: Mössbauer spectroscopic study of iron in Victorian brown coal 1467

JAMES A. DAVIS, CHRISTOPHER C. FULLER and ALISON D. COOK: A model for trace metal sorption processes at the calcite surface: Adsorption of Cd^{2+} and subsequent solid solution formation 1477

CHRISTOPHER C. FULLER and JAMES A. DAVIS: Processes and kinetics of Cd^{2+} sorption by a calcareous aquifer sand 1491

JULIA A. PECK and JOHN A. WOOD: The origin of ferrous zoning in Allende chondrule olivines 1503

MICHAEL E. FLEET and NEIL D. MACRAE: Sulfidation of Mg-rich olivine and the stability of niningerite in enstatite chondrites 1511

DAVID R. COLE, MICHAEL J. MOTTL and HIROSHI OHMOTO: Isotopic exchange in mineral-fluid systems. II. Oxygen and hydrogen isotopic investigation of the experimental basalt-seawater system 1523

J. D. HEM, C. E. ROBERSON and C. J. LIND: Synthesis and stability of hetaerolite, $ZnMn_2O_4$, at 25°C 1539

GAYLE LUX: The behavior of noble gases in silicate liquids: Solution, diffusion, bubbles and surface effects, with applications to natural samples 1549

CARL O. MOSES, D. KIRK NORDSTROM, JANET S. HERMAN and AARON L. MILLS: Aqueous pyrite oxidation by dissolved oxygen and by ferric iron 1561

FREDRICK G. PRAHL and LUIS A. PINTO: A geochemical study of long-chain *n*-aldehydes in Washington coastal sediments 1573

JAN SØRENSEN and BO BARKER JØRGENSEN: Early diagenesis in sediments from Danish coastal waters: Microbial activity and Mn-Fe-S geochemistry 1583

JERRY R. WEIDNER and ROBERT F. MARTIN: Phase equilibria of a fluorine-rich leucogranite from the St. Austell pluton, Cornwall 1591

THOMAS J. BERNATOWICZ and BRYAN E. HAGEE: Isotopic fractionation of Kr and Xe implanted in solids at very low energies 1599

DAVID KADKO, J. KIRK COCHRAN and MITCHELL LYLE: The effect of bioturbation and adsorption gradients on solid and dissolved radium profiles in sediments from the eastern equatorial Pacific 1613

JOHN E. ZUMBERGE: Prediction of source rock characteristics based on terpane biomarkers in crude oils: A multivariate statistical approach 1625

PEKKA TUISKU, PIRKKO RUOSTESUO and ANNA-MAIJA HÄKKINEN: The metamorphic behaviour and petrogenetic significance of zinc in amphibolite facies, staurolite-bearing mica schists, Puolankajärvi Formation, Central Finland 1639

JEFFERY C. SEITZ, JILL DILL PASTERIS and BRIGITTE WOPENKA: Characterization of CO_2-CH_4-H_2O fluid inclusions by microthermometry and laser Raman microprobe spectroscopy: Inferences for clathrate and fluid equilibria 1651

JEREMY B. FEIN and JOHN V. WALTHER: Calcite solubility in supercritical CO_2-H_2O fluids 1665

S. G. WAKEHAM, B. L. HOWES, J. W. H. DACEY, R. P. SCHWARZENBACH and J. ZEYER: Biogeochemistry of dimethylsulfide in a seasonally stratified coastal salt pond 1675

AKIHIKO HASHIMOTO and LAWRENCE GROSSMAN: Alteration of Al-rich inclusions inside amoeboid olivine aggregates in the Allende meteorite 1685

N. Z. BOCTOR, Y. N. SHIEH and G. KULLERUD: Mercury ores from the New Idria Mining District, California: Geochemical and stable isotope studies 1705

ERNST PERNICKA and JOHN T. WASSON: Ru, Re, Os, Pt and Au in iron meteorites 1717

JEFFREY G. RYAN and CHARLES H. LANGMUIR: The systematics of lithium abundances in young volcanic rocks 1727

CHIH-AN HUH, DEBRA L. ZAHNLE, LAWRENCE F. SMALL and VICTOR E. NOSHKIN: Budgets and behaviors of uranium and thorium series isotopes in Santa Monica Basin sediments 1743

C. A. GEIGER, R. C. NEWTON and O. J. KLEPPA: Enthalpy of mixing of synthetic almandine-grossular and almandine-pyrope garnets from high-temperature solution calorimetry 1755

Awards of the Geochemical Society

V. M. Goldschmidt Award, F. W. Clarke Award and Best Paper Award 1771

Book Reviews

EDWARD D. GOLDBERG: "Air Composition and Chemistry" by Peter Brimblecombe 1779

RICHARD W. CARLSON: "Principles of Isotope Geology", 2nd edition, by Gunter Faure 1779

PAUL C. HESS: "Short Course in Silicate Melts" edited by C. M. Scarfe 1780

Announcement

Papers to Appear in Forthcoming Issues 1781

JULY

Articles

LUTZ H. G. WIESBERG and TEREZINHA M. TAVARES: The $^{13}C/^{12}C$ record in wood of palmtrees 1783

FRANÇOIS ROBERT, MARC JAVOY, JÉRÔME HALBOUT, BERNARD DIMON and LILIANE MERLIVAT: Hydrogen isotope abundances in the solar system. Part I: Unequilibrated chondrites 1787

FRANÇOIS ROBERT, MARC JAVOY, JÉRÔME HALBOUT, BERNARD DIMON and LILIANE MERLIVAT: Hydrogen isotope abundances in the solar system. Part II: Meteorites with terrestrial-like D/H ratio 1807

BERNARD SANJUAN and GIL MICHARD: Aluminum hydroxide solubility in aqueous solutions containing fluoride ions at 50°C 1823

JAMES D. MYERS and BRUCE D. MARSH: Aleutian lead isotopic data: Additional evidence for the evolution of lithospheric plumbing systems 1833

PETER H. GIVEN and ROBERT N. MILLER: The association of major, minor and trace inorganic elements with lignites. III. Trace elements in four lignites and general discussion of all data from this study 1843

YUJI SANO, HIROSHI WAKITA and W. F. GIGGENBACH: Island arc tectonics of New Zealand manifested in helium isotope ratios 1855

B. A. SHERWOOD, S. L. SAGER and H. D. HOLLAND: Phosphorus in foraminiferal sediments from North Atlantic Ridge cores and in pure limestones 1861

JACQUES SCHWARTZENTRUBER, WALTER FÜRST and H. RENON: Dissolution of quartz into dilute alkaline solutions at 90°C: A kinetic study 1867

R. HUTCHISON, C. M. O. ALEXANDER and D. J. BARBER: The Semarkona meteorite: First recorded occurrence of smectite in an ordinary chondrite, and its implications 1875

OLAV M. KVALHEIM, ALFRED A. CHRISTY, NILS TELNÆS and ALF BJØRSETH: Maturity determination of organic matter in coals using the methylphenanthrene distribution 1883

FRANCIS J. SANSONE, CHRISTINE C. ANDREWS and MAURI Y. OKAMOTO: Adsorption of short-chain organic acids onto nearshore marine sediments 1889

R. CARPENTER, T. M. BEASLEY, D. ZAHNLE and B. L. K. SOMAYAJULU: Cycling of fallout (Pu, ^{241}Am, ^{137}Cs) and natural (U, Th, ^{210}Pb) radionuclides in Washington continental slope sediments 1897

ALAN E. RUBIN and JOHN T. WASSON: Chondrules, matrix and coarse-grained chondrule rims in the Allende meteorite: Origin, interrelationships and possible precursor components 1923

A. J. SPIVACK, M. R. PALMER and J. M. EDMOND: The sedimentary cycle of the boron isotopes 1939

A. DEUTSCH and D. STÖFFLER: Rb-Sr-analyses of Apollo 16 melt rocks and a new age estimate for the Imbrium basin: Lunar basin chronology and the early heavy bombardment of the moon 1951

I-MING CHOU: Phase relations in the system NaCl-KCl-H_2O. III: Solubilities of halite in vapor-saturated liquids above 445°C and redetermination of phase equilibrium properties in the system NaCl-H_2O to 1000°C and 1500 bars 1965

ALFONSO MUCCI: Influence of temperature on the composition of magnesian calcite overgrowths precipitated from seawater 1977

BERNARD P. BOUDREAU: A steady-state diagenetic model for dissolved carbonate species and pH in the porewaters of oxic and suboxic sediments 1985

EDWARD C. THORNTON and W. E. SEYFRIED, JR.: Reactivity of organic-rich sediment in seawater at 350°C, 500 bars: Experimental and theoretical constraints and implications for the Guaymas Basin hydrothermal system .. 1997

JONGMANN YANG and SAMUEL EPSTEIN: The effect of the isotopic composition of oxygen on the non-mass-dependent isotopic fractionation in the formation of ozone by discharge of O_2 2011

JONGMANN YANG and SAMUEL EPSTEIN: The effect of pressure and excitation energy on the isotopic fractionation in the formation of ozone by discharge of O_2 2019

NEIL C. STURCHIO, CARL M. BINZ and CARTER H. LEWIS III: Thorium-uranium disequilibrium in a geothermal discharge zone at Yellowstone 2025

DONALD BOGARD, FRED HÖRZ and PRATT JOHNSON: Shock effects and argon loss in samples of the Leedey L6 chondrite experimentally shocked to 29–70 GPa pressures 2035

Book Reviews

DUGALD M. CARMICHAEL: "Fluid-Rock Interactions during Metamorphism" edited by J. V. Walther and B. J. Wood 2045

KENNETH HSÜ: "The Ocean of Truth. A Personal History of Global Tectonics" by H. W. Menard 2045

Announcements

Symposia: Geochemistry Division of the American Chemical Society 2047

First Brazilian Congress of Geochemistry 2047

Papers to Appear in Forthcoming Issues 2048

AUGUST

Letters

B. L. JOLLIFF, J. J. PAPIKE and J. C. LAUL: Mineral recorders of pegmatite internal evolution: REE contents of tourmaline from the Bob Ingersoll pegmatite, South Dakota 2225

BARBARA L. SHERRIFF, H. DOUGLAS GRUNDY and J. STEPHEN HARTMAN: Analysis of fluid inclusions using nuclear magnetic resonance 2233

Articles

G. W. O'BRIEN, H. H. VEEH, A. R. MILNES and D. J. CULLEN: Sea-floor weathering of phosphate nodules off East Australia: Its effect on uranium oxidation state and isotopic composition 2051

GABOR ALEXANDER, ISTVAN HAZAI, JOAN GRIMALT and JOAN ALBAIGÉS: Occurrence and transformation of phyllocladanes in brown coals from Nograd Basin, Hungary 2065

RICHARD A. MORTLOCK and PHILIP N. FROELICH: Continental weathering of germanium: Ge/Si in the global river discharge 2075

ROBERT B. SYMONDS, WILLIAM I. ROSE, MARK H. REED, FREDERICK E. LICHTE and DAVID L. FINNEGAN: Volatilization, transport and sublimation of metallic and non-metallic elements in high temperature gases at Merapi Volcano, Indonesia 2083

BRUCE M. SASS, PHILIP E. ROSENBERG and JAMES A. KITTRICK: The stability of illite/smectite during diagenesis: An experimental study 2103

DANIEL J. MALVIN and MICHAEL J. DRAKE: Experimental determination of crystal/melt partitioning of Ga and Ge in the system forsterite-anorthite-diopside 2117

J. C. RODDICK: Generalized numerical error analysis with applications to geochronology and thermodynamics .. 2129

M. DILEEP KUMAR: Cation hydrolysis and the regulation of trace metal composition in seawater 2137

KENNETH R. APPLIN: The diffusion of dissolved silica in dilute aqueous solution 2147

J. L. CLAYTON and J. D. KING: Effects of weathering on biological marker and aromatic hydrocarbon composition of organic matter in Phosphoria shale outcrop 2153

G. E. BRÜGMANN, N. T. ARNDT, A. W. HOFMANN and H. J. TOBSCHALL: Noble metal abundances in komatiite suites from Alexo, Ontario, and Gorgona Island, Colombia 2159

JAMES G. ACKER, ROBERT H. BYRNE, SAMUEL BEN-YAAKOV, RICHARD A. FEELY and PETER R. BETZER: The effect of pressure on aragonite dissolution rates in seawater 2171

GEORGE R. AIKEN and RONALD L. MALCOLM: Molecular weight of aquatic fulvic acids by vapor pressure osmometry 2177

JON P. DAVIDSON: Crustal contamination *versus* subduction zone enrichment: Examples from the Lesser Antilles and implications for mantle source compositions of island arc volcanic rocks 2185

RICHARD OESTRIKE, WANG-HONG YANG, R. JAMES KIRKPATRICK, RICHARD L. HERVIG, ALEXANDRA NAVROTSKY and BEN MONTEZ: High-resolution ^{23}Na, ^{27}Al, and ^{29}Si NMR spectroscopy of framework aluminosilicate glasses 2199

H. T. HASELTON, JR., R. A. ROBIE and B. S. HEMINGWAY: Heat capacities of synthetic hedenbergite, ferrobustamite, and $CaFeSi_2O_6$ glass 2211

RICHARD A. ROBIE, ZHAO BIN, BRUCE S. HEMINGWAY and MARK D. BARTON: Heat capacity and thermodynamic properties of andradite garnet, $Ca_3Fe_2Si_3O_{12}$, between 10 and 1000 K and revised values for $\Delta_f G^\circ_m$ (298.15 K) of hedenbergite and wollastonite 2219

Book Reviews

SHELDON LANDSBERGER: "Nuclear Geophysics," Vol. 1, no. 1, Pergamon Journals Ltd. 2237

A. A. LEVINSON: Comment on a review of *Applied Geochemistry* 2237

Announcements

"Volcanism in Hawaii" 2238

Papers to Appear in Forthcoming Issues 2239

SEPTEMBER

Letters

ROB N. J. COMANS and JACK J. MIDDELBURG: Sorption of trace metals on calcite: Applicability of the surface precipitation model 2587

E. R. VANCE and M. GASCOYNE: Isotopic disequilibrium effects in leaching of natural uraninite and thorianite .. 2593

Articles

T. J. BARRETT, P. N. TAYLOR and J. LUGOWSKI: Metalliferous sediments from DSDP Leg 92: The East Pacific Rise transect 2241

CYRENA ANNE GOODRICH, JOHN H. JONES and JOHN L. BERKLEY: Origin and evolution of the ureilite parent magmas: Multi-stage igneous activity on a large parent body 2255

MARIE-JOSÉE JANSSENS, JAN HERTOGEN, RAINER WOLF, MITSURU EBIHARA and EDWARD ANDERS: Ureilites: Trace element clues to their origin 2275

A. M. MCNEIL and A. D. EDGAR: Sodium-rich metasomatism in the upper mantle: Implications of experiments on the pyrolite-Na_2O-rich fluid system at 950°C, 20 kbar 2285

RYUJI TADA, ROBERT MALIVA and RAYMOND SIEVER: A new mechanism for pressure solution in porous quartzose sandstone 2295

M. R. THORNBER, E. BETTENAY and W. G. R. RUSSELL: A mechanism of aluminosilicate cementation to form a hardpan 2303

GEORGE R. HOLDREN, JR. and PATRICIA M. SPEYER: Reaction rate-surface area relationships during the early stages of weathering. II. Data on eight additional feldspars 2311

M. R. PALMER, A. J. SPIVACK and J. M. EDMOND: Temperature and pH controls over isotopic fractionation during adsorption of boron on marine clay 2319

GEORGE R. ROSSMAN, D. WEIS and G. J. WASSERBURG: Rb, Sr, Nd and Sm concentrations in quartz 2325

S. E. CALVERT, D. Z. PIPER and P. A. BAEDECKER: Geochemistry of the rare earth elements in ferromanganese nodules from DOMES Site A, northern equatorial Pacific 2331

E. A. MATHEZ: Carbonaceous matter in mantle xenoliths: Composition and relevance to the isotopes 2339

ROBERT J. ROSENBAUER and JAMES L. BISCHOFF: Pressure-composition relations for coexisting gases and liquids and the critical points in the system NaCl-H_2O at 450, 475, and 500°C 2349

E. J. REARDON and R. D. BECKIE: Modelling chemical equilibria of acid mine-drainage: The $FeSO_4$-H_2SO_4-H_2O system 2355

JAAP S. SINNINGHE DAMSTÉ, JAN W. DE LEEUW, A. C. KOCK-VAN DALEN, MARTIN A. DE ZEEUW, FRITS DE LANGE, W. IRENE C. RIJPSTRA and P. A. SCHENCK: The occurrence and identification of series of organic sulphur compounds in oils and sediment extracts. I. A study of Rozel Point Oil (U.S.A.) 2369

JAAP S. SINNINGHE DAMSTÉ, A. C. KOCK-VAN DALEN, JAN W. DE LEEUW, P. A. SCHENCK, SHENG GUOYING and SIMON C. BRASSELL: The identification of mono-, di- and trimethyl 2-methyl-2-(4,8,12-trimethyltridecyl)chromans and their occurrence in the geosphere 2393

DAVID J. WRONKIEWICZ and KENT C. CONDIE: Geochemistry of Archean shales from the Witwatersrand Supergroup, South Africa: Source-area weathering and provenance 2401

R. FRANCOIS: The influence of humic substances on the geochemistry of iodine in nearshore and hemipelagic marine sediments 2417

ROBERTO T. PABALAN and KENNETH S. PITZER: Thermodynamics of concentrated electrolyte mixtures and the prediction of mineral solubilities to high temperatures for mixtures in the system Na-K-Mg-Cl-SO_4-OH-H_2O .. 2429

Y. V. KISSIN: Catagenesis and composition of petroleum: Origin of *n*-alkanes and isoalkanes in petroleum crudes 2445

J. BERTON FISHER: Distribution and occurrence of aliphatic acid anions in deep subsurface waters 2459

HARRY Y. MCSWEEN, JR.: Aqueous alteration in carbonaceous chondrites: Mass balance constraints on matrix mineralogy 2469

TRACY N. TINGLE: An evaluation of the carbon-14 beta track technique: Implications for solubilities and partition coefficients determined by beta track mapping 2479

H. A. KENNEDY and H. ELDERFIELD: Iodine diagenesis in pelagic deep-sea sediments 2489

H. A. KENNEDY and H. ELDERFIELD: Iodine diagenesis in non-pelagic deep-sea sediments 2505

NILANJAN CHATTERJEE: Evaluation of thermochemical data on Fe-Mg olivine, orthopyroxene, spinel and Ca-Fe-Mg-Al garnet 2515

JOHN F. KERRIDGE, SHERWOOD CHANG and RUTH SHIPP: Isotopic characterisation of kerogen-like material in the Murchison carbonaceous chondrite 2527

K. G. HEUMANN, M. GALL and H. WEISS: Geochemical investigations to explain iodine-overabundances in Antarctic meteorites 2541

T. MARK HARRISON, JOHN N. ALEINIKOFF and W. COMPSTON: Observations and controls on the occurrence of inherited zircon in Concord-type granitoids, New Hampshire 2549

M. ALISA MAST and JAMES I. DREVER: The effect of oxalate on the dissolution rates of oligoclase and tremolite .. 2559

J. D. CLEMENS, S. CIRCONE, A. NAVROTSKY, P. F. MCMILLAN, B. K. SMITH and V. J. WALL: Phlogopite: High temperature solution calorimetry, thermodynamic properties, Al-Si and stacking disorder, and phase equilibria 2569

ROGER POCKLINGTON and FRANCIS C. TAN: Seasonal and annual variations in the organic matter contributed by the St. Lawrence River to the Gulf of St. Lawrence 2579

Book Reviews

DENIS M. SHAW: "The Birth of the Earth" by David E. Fisher 2595

DENIS M. SHAW: "Radiant Science, Dark Politics. A Memoir of the Nuclear Age" by Martin D. Kamen 2595

RUSSELL S. HARMON: "Radioactivity in Geology" by E. M. Durrance 2595

PHILIP E. BROWN: "Fluid Inclusion Research, Vol. 18" edited by Edwin Roedder 2596

CHARLES W. NAESER: "Solid State Nuclear Track Detection" by S. A. Durrani and R. K. Bull 2596

PETER H. GIVEN: "Biological Markers in the Sedimentary Record" edited by R. B. Johns 2596

Announcements

The Geochemical Society Council Meeting, Summary of Minutes 2597

The Meteoritical Society, 51st Annual Meeting 2601

Papers to Appear in Forthcoming Issues 2602

OCTOBER

Letters

P. K. ZEITLER, A. L. HERCZEG, I. MCDOUGALL and M. HONDA: U-Th-He dating of apatite: A potential thermochronometer 2865

I. FARNAN, S. C. KOHN and R. DUPREE: A study of the structural role of water in hydrous silica glass using cross-polerisation magic angle spinning NMR 2869

W. G. PROWSE, M. I. CHICARELLI, B. J. KEELY, S. KAUR and J. R. MAXWELL: Characterisation of fossil porphyrins of the "di-DPEP" type 2875

Articles

KEN O. BUESSELER and EDWARD R. SHOLKOVITZ: The geochemistry of fallout plutonium in the North Atlantic: I. A pore water study in shelf, slope and deep-sea sediments 2605

KEN O. BUESSELER and EDWARD R. SHOLKOVITZ: The geochemistry of fallout plutonium in the North Atlantic: II. $^{240}Pu/^{239}Pu$ ratios and their significance 2623

CHRISTIAN DE CAPITANI and THOMAS H. BROWN: The computation of chemical equilibrium in complex systems containing non-ideal solutions 2639

S. R. SUTTON, J. S. DELANEY, J. V. SMITH and M. PRINZ: Copper and nickel partitioning in iron meteorites 2653

GENKI I. MATSUMOTO, TSUTOMU MACHIHARA, NORIYUKI SUZUKI, MINORU FUNAKI and KUNIHIKO WATANUKI: Steranes and triterpanes in the Beacon Supergroup samples from southern Victoria Land in Antarctica 2663

S. BELVISO, P. JEAN-BAPTISTE, B. C. NGUYEN, L. MERLIVAT and L. LABEYRIE: Deep methane maxima and ^3He anomalies across the Pacific entrance to the Celebes Basin 2673

C. F. HOFFMANN, C. B. FOSTER, T. G. POWELL and R. E. SUMMONS: Hydrocarbon biomarkers from Ordovician sediments and the fossil alga *Gloeocapsomorpha prisca* Zalessky 1917 2681

ANNETTE AMBERGER und H.-L. SCHMIDT: Natürliche Isotopengehalte von Nitrat als Indikatoren für dessen Herkunft 2699

JUDITH C. SEALY, NIKOLAAS J. VAN DER MERWE, JULIA A. LEE THORP and JOHN L. LANHAM: Nitrogen isotopic ecology in southern Africa: Implications for environmental and dietary tracing 2707

JEFFREY G. ZUKIN, DOUGLAS E. HAMMOND, TEH-LUNG KU and WILFRED A. ELDERS: Uranium-thorium series radionuclides in brines and reservoir rocks from two deep geothermal boreholes in the Salton Sea Geothermal Field, southeastern California 2719

A. BISCHOFF and H. PALME: Composition and mineralogy of refractory-metal-rich assemblages from a Ca,Al-rich inclusion in the Allende meteorite 2733

R. F. FUDALI, M. DARBY DYAR, DAVID L. GRISCOM and HENRY D. SCHREIBER: The oxidation state of iron in tektite glass 2749

TAKESHI OGINO, TOSHIO SUZUKI and KIYOSHI SAWADA: The formation and transformation mechanism of calcium carbonate in water 2757

C. P. STRONG, ROBERT R. BROOKS, SHANE M. WILSON, ROGER D. REEVES, CHARLES J. ORTH, XUE-YING MAO, LEONARD R. QUINTANA and EDWARD ANDERS: A new Cretaceous-Tertiary boundary site at Flaxbourne River, New Zealand: Biostratigraphy and geochemistry 2769

BRENT A. MCKEE, DAVID J. DEMASTER and CHARLES A. NITTROUER: Uranium geochemistry on the Amazon shelf: Evidence for uranium release from bottom sediments 2779

A. G. LATHAM and H. P. SCHWARCZ: The relative mobility of U, Th and Ra isotopes in the weathered zones of the Eye-Dashwa Lakes granite pluton, northwestern Ontario, Canada 2787

THOMAS F. ANDERSON, JOHN KRUGER and ROBERT RAISWELL: C-S-Fe relationships and the isotopic composition of pyrite in the New Albany Shale of the Illinois Basin, U.S.A. 2795

JAMES K. B. BISHOP and MARTIN Q. FLEISHER: Particulate manganese dynamics in Gulf Stream warm-core rings and surrounding waters of the N.W. Atlantic 2807

SIGURDUR R. GISLASON and HANS P. EUGSTER: Meteoric water-basalt interactions. I: A laboratory study 2827

SIGURDUR R. GISLASON and HANS P. EUGSTER: Meteoric water-basalt interactions. II: A field study in N.E. Iceland 2841

TOSHITAKA GAMO, JUN-ICHIRO ISHIBASHI, HITOSHI SAKAI and BRONTE TILBROOK: Methane anomalies in seawater above the Loihi submarine summit area, Hawaii 2857

Announcements

The Meteoritical Society Nominations for the Leonard Medal 2879

Papers to Appear in Forthcoming Issues 2880

NOVEMBER

Letter

ROGER E. SUMMONS, JOHN K. VOLKMAN and CHRISTOPHER J. BOREHAM: Dinosterane and other steroidal hydrocarbons of dinoflagellate origin in sediments and petroleum 3075

Articles

RONALD AMUNDSON and EUGENE KELLY: The chemistry and mineralogy of a CO_2-rich travertine depositing spring in the California Coast Range 2883

T. C. ONSTOTT and M. W. PEACOCK: Argon retentivity of hornblendes: A field experiment in a slowly cooled metamorphic terrane 2891

MARK D. KURZ, MICHAEL O. GARCIA, FRED A. FREY and P. A. O'BRIEN: Temporal helium isotopic variations within Hawaiian volcanoes: Basalts from Mauna Loa and Haleakala 2905

RONALD S. OREMLAND, LAURENCE G. MILLER and MICHAEL J. WHITICAR: Sources and flux of natural gases from Mono Lake, California 2915

REBECCA A. LANGE and IAN S. E. CARMICHAEL: Densities of Na_2O-K_2O-CaO-MgO-FeO-Fe_2O_3-Al_2O_3-TiO_2-SiO_2 liquids: New measurements and derived partial molar properties 2931

JAMES E. MACKIN and KENNETH T. SWIDER: Modeling the dissolution behavior of standard clays in seawater ... 2947

EDWARD T. FURLONG, LINDA ROLL CESSAR and RONALD A. HITES: Accumulation of polycyclic aromatic hydrocarbons in acid sensitive lakes 2965

J. L. CROVISIER, J. HONNOREZ and J. P. EBERHART: Dissolution of basaltic glass in seawater: Mechanism and rate 2977

ROBERT I. HADDAD and CHRISTOPHER S. MARTENS: Biogeochemical cycling in an organic-rich coastal marine basin: 9. Sources and accumulation rates of vascular plant-derived organic material 2991

JEFFREY N. GROSSMAN and JOHN T. WASSON: Compositional evidence regarding the origins of rims on Semarkona chondrules 3003

BRADLY D. KECK and DEREK W. G. SEARS: Chemical and physical studies of type 3 chondrites—VIII: Thermoluminescence and metamorphism in the CO chondrites 3013

WILHELM PÜTTMANN and HÉCTOR VILLAR: Occurrence and geochemical significance of 1,2,5,6-tetramethylnaphthalene 3023

H. RODGER HARVEY, GEOFFREY EGLINTON, SEAN C. M. O'HARA and ERIC D. S. CORNER: Biotransformation and assimilation of dietary lipids by *Calanus* feeding on a dioflagellate 3031

SCOTT A. WOOD: Thermodynamic calculations of the volatility of the platinum group elements (PGE): The PGE content of fluids at magmatic temperatures 3041

STUART G. WAKEHAM: Steroid geochemistry in the oxygen minimum zone of the eastern tropical North Pacific Ocean 3051

Critical Comment and Authors' Reply

STEPHEN G. FRANKS: Comment on "Diagenetic history of Eocene Wilcox sandstones, South-Central Texas" 3071

R. STEPHEN FISHER and LYNTON S. LAND: "Diagenetic history of Eocene Wilcox sandstones, South-Central Texas" 3073

Book Reviews

YEHOSHUA KOLODNY: "Handbook of Environmental Isotope Geochemistry, Vol. 2, The Terrestrial Environment, B" edited by P. Fritz and J. Ch. Fontes 3083

JAMES L. GOODING: "Clay Minerals and the Origin of Life" edited by A. G. Cairns-Smith and H. Hartman 3083

URSULA B. MARVIN: "How to Build a Habitable Planet" by Wallace S. Broecker 3084

JOHN W. VALLEY: "The Nature of the Lower Continental Crust" edited by J. B. Dawson *et al.* 3084

Announcement

Papers to Appear in Forthcoming Issues 3085

DECEMBER

Articles

LAWRENCE M. ANOVITZ, BRUCE S. HEMINGWAY, EDGAR F. WESTRUM, JR., GUY W. METZ and ERIC J. ESSENE: Heat capacity measurements for cryolite (Na_3AlF_6) and reactions in the system Na-Fe-Al-Si-O-F 3087

KIMBERLEY M. CUMBERS, ROBERT ALEXANDER and ROBERT I. KAGI: Methylbiphenyl, ethylbiphenyl and dimethylbiphenyl isomer distributions in some sediments and crude oils 3105

A. H. BATH, W. G. DARLING, I. A. GEORGE and A. E. MILODOWSKI: $^{18}O/^{16}O$ and $^{2}H/^{1}H$ changes during progressive hydration of a Zechstein anhydrite formation 3113

GIULIO OTTONELLO: Energies and interactions in binary (Pbnm) orthosilicates: A Born parametrization 3119

WILLIAM M. MURPHY and HAROLD C. HELGESON: Thermodynamic and kinetic constraints on reaction rates among minerals and aqueous solutions. III. Activated complexes and the pH-dependence of the rates of feldspar, pyroxene, wollastonite, and olivine hydrolysis 3137

JOHN T. ARMSTRONG, IAN D. HUTCHEON and G. J. WASSERBURG: Zelda and Company: Petrogenesis of sulfide-rich Fremdlinge and constraints on solar nebula processes 3155

IAN D. HUTCHEON, JOHN T. ARMSTRONG and G. J. WASSERBURG: Isotopic studies of Mg, Fe, Mo, Ru and W in Fremdlinge from Allende refractory inclusions 3175

GEORGE W. LUTHER, III: Pyrite oxidation and reduction: Molecular orbital theory considerations 3193

KIMITAKA KAWAMURA and I. R. KAPLAN: Dicarboxylic acids generated by thermal alteration of kerogen and humic acids 3201

PATRICIA M. MASTERS: Preferential preservation of noncollagenous protein during bone diagenesis: Implications for chronometric and stable isotopic measurements 3209

ALBERT J. FAHEY, ERNST K. ZINNER, GHISLAINE CROZAZ and ALAN S. KORNACKI: Microdistributions of Mg isotopes and REE abundances in a Type A calcium-aluminum-rich inclusion from Efremovka 3215

DAVID R. TURNER and MICHAEL WHITFIELD: An equilibrium speciation model for copper in sea and estuarine waters at 25°C including complexation with glycine, EDTA and NTA 3231

E. J. DASCH, C.-Y. SHIH, B. M. BANSAL, H. WIESMANN and L. E. NYQUIST: Isotopic analysis of basaltic fragments from lunar breccia 14321: Chronology and petrogenesis of pre-Imbrium mare volcanism 3241

C.-Y. SHIH, L. E. NYQUIST, D. D. BOGARD, E. J. DASCH, B. M. BANSAL and H. WIESMANN: Geochronology of high-K mare basalt clasts from Apollo 14 breccia 14304 3255

ALAN M. SHILLER and EDWARD A. BOYLE: Variability in dissolved trace metals in the Mississippi River 3273

Book Reviews

JOHN W. MORGAN: "Applied Geochemical Analysis" by C. O. Ingamells and Francis F. Pitard 3279

CINDY LEE: "Biogeochemical Processes at the Land-Sea Boundary" edited by P. Lasserre and J. Martin 3280

Y. K. BENTOR: "Phosphorites" edited by Jaques Lucas and Liliane Prévôt 3281

JOHN W. FARRINGTON: "Fossil Fuel Biomarkers. Applications and Spectra" by R. P. Philp 3282

Announcements

Papers to Appear in Forthcoming Issues 3283

Books Received in 1987 but Not Reviewed 3287

Geochimica et Cosmochimica Acta Production Schedule 1988 3287

Annual Index 0000